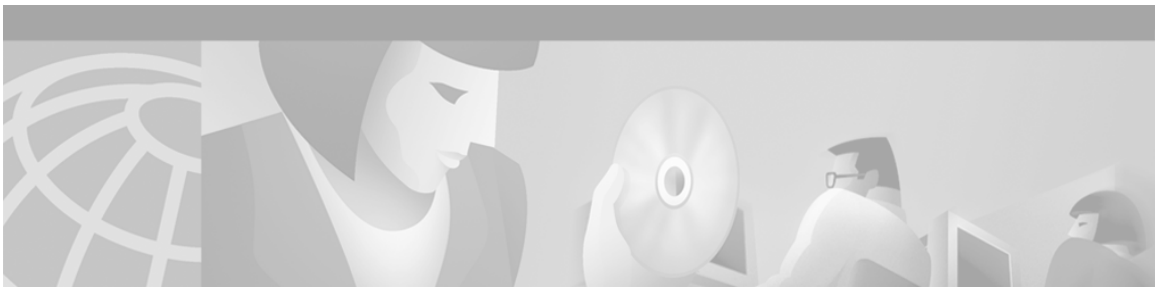

Cisco 3640 Series Router-PBX Interoperability: VIC 2BRI-NT/TE card to Alcatel 4400 PBX with BRI ISDN QSIG Signaling

This document describes the interoperability and configuration of a Cisco 3640 series router with a VIC 2BRI-NT/TE card to an Alcatel 4400 PBX using BRI ISDN QSIG signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Model	Alcatel 4400
PBX Release	R3.2
Telephony Signaling	BRI ISDN QSIG
Voice Gateway	Cisco 3640 series router
Gateway Release	Cisco IOS Release 12.2(1a)
VoX Protocol	H.323

Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Alcatel PBX Configuration
- Cisco 3640 Series Router Configuration

Set Up

This section includes the following information:

- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: Test Configuration

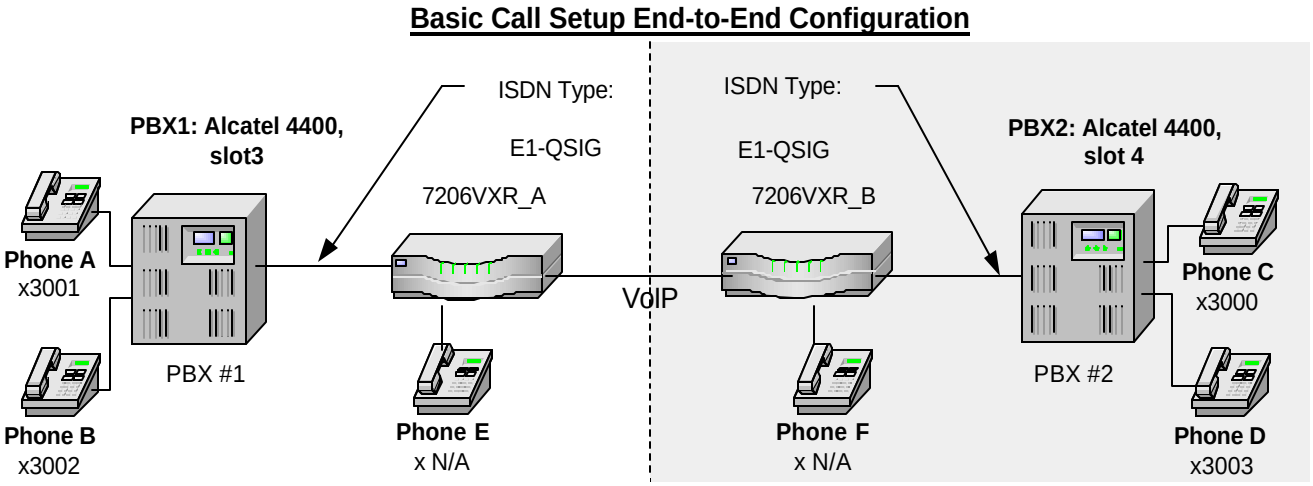

Figure 1 represents the configuration used for testing: an Alcatel 4400PBX connected to a Cisco 3640 series router through an E1-QSIG connection.

Set Up Notes

The Cisco 3640 router with ISDN switch type setting of **basic-qsig** supports both protocol sides by using the **isdn protocol-emulate network/user** command.

- The Alcatel 4400 supports both "USER" (slave) and "NETWORK" (master) protocol sides.
- The following options are of particular interest:
  - Trunk **interface type** must be set to **BRA2.**
  - Network/User options are set in the Board/Digital Access Options menu. **Network mode** must be set to **Yes** for Master/Network or **No** for Slave/User.
  - **Access Type** must be set to **T0**.
  - **Q931 signal variant** is used to determine Protocol type. This option was set to **ISDN ABC-F.**

The Alcatel 4400 PBX configuration screen for the BRI trunk interface is reached using both Alcatel Board and Board\Digital Access menus, setting the BRI physical layer parameters.

Alcatel PBX Configuration

Alcatel PBX Version Information

- Software: Version R3.2
- Hardware: BRA2, 3BA23076.

Version Information

```
\compidea\Node

          Node Number (reserved)   1
          Software Version         R3.2
          Version name             c1.712
          Patch No.                5
          Notes
          Object Identity
          Node Number (reserved)   1
          Ethernet Notes
                Netmask
                Local CPU
                      Name         x000000_tun
                      IP Address   172.30.253.253
                Twin Cpu
                      Name
                      IP Address
                Main Cpu
                      Name         xm000000
                      IP Address   10.253.253.3
                StandBy Cpu
                      Name
                      IP Address
          SL Notes
          IP/X25 Tunnel Notes
                Netmask            255.255.0.0
                Local Node
                      Name         x000000_tun
                      IP Address   172.30.253.253
```

Alcatel PBX Sample Configuration

See the following sections for sample configuration information:

- Trunk Cards Were Configured the Same
- Digital Access Options
- Trunk Group
- Trunk Detail

Trunk Cards Were Configured the Same

Interface type must be set to **BRA2.**

```
\compidea\Shelf::0\Board::9

Board Address                          9
Interface Type                         BRA2
Usage State                            Active
Operational State                      Enabled
Main/Standby State                     Main (Master)
Number Of Sets Being Connect.          1
Country Protocol Type                  Default
Incidents Teleservice                  YES
ISDN Board Layer 2 Parameters
      Retransmission Timer             100
      TEI Identity Check Timer         100
      Polling Timer                    1000
      Nb_Of_Retransmission             3
      Max Frame Size (Bytes)           260
      Window Size In Frames SAPI S T0  1
      Window Size In Frames SAPI P T0  3
      Window Size In Frames SAPI S T2  7
      Window Size In Frames SAPI P T2  7
```

Digital Access Options

Network mode must be set to **Yes** for Master/Network or **No** for Slave/User.
Access Type must be set to **T0**.

```
\compidea\Shelf::0\Board::9\Digital Access::2

T0/T2 Access No.                 2
Access Type                      T0
Synchronisation Priority         255
Network Mode                     NO
Max Nb Of Used B Channels        2
Max_Nb_Of_Compressed_B_Channels  0
TieLine Mode                     NO
Access Type S0                   NO
Reserved1                        NO
Reserved2                        NO
Network Date Time Update         NO
```

Trunk Group

Q931 signal variant is used to determine Protocol type. **ISDN ABC-F** is Alcatel proprietary.

```
\compidea\Trunk Groups::8

Trunk Group Id                   8
Trunk Group Type                 T0
Trunk Group Name                 BRI-ABC-F
Node number                      1
Transcom Trunk Group             False
Auto.reserv.by Attendant         False
Overflow trunk group No.         -1
Tone on seizure                  True
```

```
Private Trunk Group                 False
Security Patrol                     False
Q931 signal variant                 ABC-F
Number Compatible With              -1
Number Of Digits To Send            4
Remote Network                      15
Shared Trunk Group                  False
auto.DTMF dialing on outgoing call  NO
Public Network Category             0
DDI transcoding                     False
Special Services                    Nothing
Can support UUS in SETUP            True
```

Trunk Detail

```
\compidea\Trunk Groups::8\Trunk Group::1

Instance (reserved)                 1
Trunk Group Type                    T0
Public Network Ref.
Dialling end to end                 NO
DTMF end to end signal.             NO
Trunk group used in DISA            NO
DISA Secret Code
VG for non-existent No.             YES
Routing To Executive                NO
Trunk Category Id                   18
Nb of digits unused (ISDN)          4
B Channel Choice                    YES
Channels Reserved By Attend.        0
Dissuasion For ACD                  NO
DTO joining                         NO
Enquiry Call On B Channel           NO
Automated Attendant                 NO
Calling party Rights category       0
Entity Number                       0
TS Overflow                         YES
Number To Be Added
Supervised by Routing               NO
VPN Cost Limit for Incom.Calls      0
Immediat Trk Listening For VPNCall  YES
VPN TS %                            50
Csta Monitored                      NO
Max.% of trunks out CCD             0
Charge Calling And ADN Creation     NO
Ratio analog.to ISDN tax
TS Distribution on Accesses         YES
Use Split Acces                     NO
Heterogeneous Remote Network        NO
Barring mode                        Not barred
ARS class of service                31
Quality profile for voice on IP     Profile #1
IP compression type                 Default
Use of volume in system             YES
```

Cisco 3640 Series Router Configuration

The following is the configuration of the Cisco 3640 series router connected to the Alcatel 4400 ISDN BRI ISDN QSIG signaling interface.

- Cisco 3640 Series Router Version Information
- Cisco 3640 Series Router Sample Configuration

Cisco 3640 Series Router Version Information

- Cisco IOS™ (C3640-JS-M), Version 12.2(1a).
- Cisco 3640 (R4700) processor (revision 0x00) with 59392K/6144K bytes of f memory.

```
3640_B#
3640_B#sho ver
Cisco Internetwork Operating System Software
IOS (tm) 3600 Software (C3640-JS-M), Version 12.2(1a), RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Sat 26-May-01 02:40 by pwade
Image text-base: 0x60008950, data-base: 0x61492000

ROM: System Bootstrap, Version 11.1(7)AX [kuong (7)AX], EARLY DEPLOYMENT RELEASE SOFTWARE
(fc2)

3640_B uptime is 1 hour, 21 minutes
System returned to ROM by power-on
System image file is "flash:c3640-js-mz.122-1a.bin"

cisco 3640 (R4700) processor (revision 0x00) with 59392K/6144K bytes of memory.
Processor board ID 05247801
R4700 CPU at 100Mhz, Implementation 33, Rev 1.0
Channelized E1, Version 1.0.
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Primary Rate ISDN software, Version 1.1.
Basic Rate ISDN software, Version 1.1.
2 Ethernet/IEEE 802.3 interface(s)
31 Serial network interface(s)
2 ISDN Basic Rate interface(s)
2 Channelized E1/PRI port(s)
2 Voice FXS interface(s)
4 Voice NT or TE BRI interface(s)
DRAM configuration is 64 bits wide with parity disabled.
125K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

3640_B#
3640_B#
```

Cisco 3640 Series Router Sample Configuration

The following is a sample configuration of the Cisco 3640 series router directly connected to Alcatel 4400 PBX, slot 3 ISDN PRI interface.

```
3640_B#
3640_B#sho diag
Slot 0:
        Combo 2E, 2W Port adapter, 4 ports
        Port adapter is analyzed
```

```
        Port adapter insertion time unknown
        EEPROM contents at hardware discovery:
        Hardware revision 1.2           Board revision B0
        Serial number     7687847       Part number    800-01171-04
        Test history      0x0           RMA number     00-00-00
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 1E 01 02 00 75 4E A7 50 04 93 04 00 00 00 00
          0x30: 58 00 00 00 98 02 28 17 FF FF FF FF FF FF FF FF

Slot 1:
        High Density Voice Port adapter
        Port adapter is analyzed
        Port adapter insertion time unknown
        EEPROM contents at hardware discovery:
        Hardware Revision        : 1.0
        Top Assy. Part Number    : 800-03567-01
        Board Revision           : A0
        Deviation Number         : 0-0
        Fab Version              : 02
        PCB Serial Number        : JAB03350B9K
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 00 CC 41 01 00 C0 46 03 20 00 0D EF 01
          0x10: 42 41 30 80 00 00 00 00 02 02 C1 8B 4A 41 42 30
          0x20: 33 33 35 30 42 39 4B 03 00 81 00 00 00 00 04 00
          0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

        WIC Slot 0:
        E1 (2 Port) Multi-Flex Trunk WAN Daughter Card
        Hardware revision 1.0           Board revision B0
        Serial number     18779824      Part number    800-04479-01
        Test history      0x0           RMA number     00-00-00
        Connector type    PCI
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 23 01 00 01 1E 8E B0 50 11 7F 01 00 00 00 00
          0x30: 58 00 00 00 00 02 25 00 FF FF FF FF FF FF FF FF

        HDV firmware: Compiled Wed 04-Oct-00 20:58 by mani
        HDV memory size 524280 heap free 180601

Slot 2:
        4 PORT Voice PM for MARs Port adapter
        Port adapter is analyzed
        Port adapter insertion time unknown
        EEPROM contents at hardware discovery:
        Hardware revision 1.1           Board revision D0
        Serial number     15077168      Part number    800-02491-02
        Test history      0x0           RMA number     00-00-00
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 65 01 01 00 E6 0F 30 50 09 BB 02 00 00 00 00
          0x30: 68 00 00 00 99 07 31 17 FF FF FF FF FF FF FF FF

        WIC Slot 0:
        FXS Voice daughter card (2 port)
        Hardware revision 1.1           Board revision F0
        Serial number     14674684      Part number    800-02493-01
        Test history      0x0           RMA number     00-00-00
        Connector type    Wan Module
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 0E 01 01 00 DF EA FC 50 09 BD 01 00 00 00 00
          0x30: 78 00 00 00 99 07 12 01 FF FF FF FF FF FF FF FF
```

```
Slot 3:
        4 PORT Voice PM for MARs Port adapter
        Port adapter is analyzed
        Port adapter insertion time unknown
        EEPROM contents at hardware discovery:
        Hardware revision 1.1           Board revision H0
        Serial number     25140072      Part number    800-02491-02
        Test history      0x0           RMA number     00-00-00
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 65 01 01 01 7F 9B 68 50 09 BB 02 00 00 00 00
          0x30: 88 00 00 00 01 02 15 17 FF FF FF FF FF FF FF FF

        WIC Slot 0:
        NT or TE BRI Voice daughter card (2 port)
        Hardware revision 1.255         Board revision V7
        Serial number     4294967295    Part number    800-11534335-255
        Test history      0xFF          RMA number     255-255-255
        Connector type    PCI
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 32 01 FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

3640_B#
3640_B#
3640_B#sho interfaces bri 3/0
BRI3/0 is up, line protocol is up (spoofing)
  Hardware is Voice NT or TE BRI
  MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation VOICE, loopback not set
  Last input 00:00:00, output never, output hang never
  Last clearing of "show interface" counters 00:00:12
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/16 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 48 kilobits/sec
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     2 packets input, 8 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
3640_B#
3640_B#
3640_B#
3640_B#
3640_B#sho run
Building configuration...

Current configuration : 2259 bytes
!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
no service dhcp
!
hostname 3640_B
!
boot system flash
logging rate-limit console 10 except errors
!
voice-card 1
```

```
!
ip subnet-zero
!
!
no ip finger
no ip domain-lookup
ip host whiz 171.69.1.162
ip host dirt 171.69.1.129
ip host danube 171.69.17.14
!
no ip dhcp-client network-discovery
isdn switch-type basic-qsig
call rsvp-sync
cns event-service server
!
!
!
!
!
!
!
controller E1 1/0
 shutdown
 framing NO-CRC4
 ds0-group 1 timeslots 1 type r2-analog r2-compelled
 cas-custom 1
!
controller E1 1/1
 shutdown
 pri-group timeslots 1-31
!
!
interface Tunnel1
 no ip address
!
interface Ethernet0/0
 ip address 100.100.100.2 255.255.255.0
 no ip mroute-cache
 half-duplex
 no cdp enable
!
interface Ethernet0/1
 ip address 171.69.231.23 255.255.255.0
 no ip mroute-cache
 half-duplex
 no cdp enable
!
interface Serial1/1:15
 no ip address
 no logging event link-status
 shutdown
 isdn switch-type primary-net5
 isdn overlap-receiving
 isdn protocol-emulate network
 isdn incoming-voice voice
 no isdn T309-enable
 isdn T203 30000
 isdn T310 60000
 isdn bchan-number-order ascending
 no cdp enable
!
interface BRI3/0
 no ip address
 no ip route-cache
 no ip mroute-cache
 isdn switch-type basic-qsig
 isdn overlap-receiving
 isdn protocol-emulate network
 isdn layer1-emulate network
 isdn incoming-voice voice
 isdn T310 40000
 isdn skipsend-idverify
```

```
!
interface BRI3/1
 no ip address
 isdn switch-type basic-net3
 isdn T310 120000
!
ip kerberos source-interface any
ip classless
no ip http server
!
dialer-list 1 protocol ip permit
no cdp run
!
!
voice-port 1/0:1
!
voice-port 1/1:15
!
voice-port 2/0/0
!
voice-port 2/0/1
!
voice-port 3/0/0
 compand-type a-law
!
voice-port 3/0/1
!
dial-peer cor custom
!
!
!
dial-peer voice 2 pots
 destination-pattern 4200
 port 2/0/0
!
dial-peer voice 4 voip
 destination-pattern 2...
 session target ipv4:100.100.100.1
!
dial-peer voice 3 pots
 destination-pattern 3...
 direct-inward-dial
 port 3/0/0
 prefix 3
!
dial-peer voice 6 voip
 destination-pattern 5...
 session target ipv4:100.100.100.1
!
!
line con 0
 transport input none
line aux 0
line vty 0 4
 no login
!
end

3640_B#
3640_B#
```

Caveats

- Calling/Called Number is not shown on Alcatel phone display (one line display phone show Name only) due to limitation on one line display phone.